SCIENTIFIC JOURNALS AND ARTICLES.

The leading article in the August number of the *Journal of Nervous and Mental Disease* is Dr. Stedman's address as president of the American Neurological Association. His subject was 'The Public Obligations of the Neurologist,' and he urged the establishment of charitable sanitaria for the care of the poor who suffered from nervous diseases. He spoke of the fading out of the division between psychiatry and neurology, and the advance of the treatment of mental disorders by mental and moral methods. He also emphasized the importance of public provision for the after care of patients discharged from the state hospitals, and urged the removal of the feeble-minded to separate colonies. Drs. Spiller and Weisenburg contribute the report of eleven cases of carcinoma involving the nervous system, with a number of illustrations. Dr. Burr follows with a note on the temporary disappearance of the sensory symptoms in syringomyelia, and Dr. Martin adds a short study of the sphincter reflexes in tabes dorsalis and paresis.

The *Annals of Iowa* for July, 1906, a magazine published quarterly by the State Historical Department at Des Moines, contains an appreciative biographical memoir of the late Dr. C. C. Parry, by Dr. Charles A. White. This memoir thus becomes a part of the state archives.

DISCUSSION AND CORRESPONDENCE.

THE PRIMARY SEPTA IN RUGOSE CORALS.

In Science, June 30, 1905, there appears an abstract of a paper, 'Early Stages of some Paleozoic Corals,' read by Mr. C. E. Gordon before the New York Academy of Sciences. The abstract is mainly a criticism of my paper, 'Relationships of the Rugosa (Tetracoralla) to the living Zoantheæ,' 1902. Having delayed a reply until the publication of the complete contribution,[1] I am now in a better position to estimate the value of the evidence upon which the author's assertions are based. A full discussion, with additional evidence in support of my contentions, will appear later, but in the meantime the importance of the subject calls for a brief statement.

The greater part of Gordon's final paper is devoted to a demonstration that the septal arrangement in *Lophophyllum proliferum*, the form studied by me, can be brought into agreement with the usually accepted septal plan of zaphrentoid corals, a fact upon which there could possibly be no divergence of opinion. To accomplish this he reproduces most of my figures, but in an inverted manner, and then shows how they agree with the septal plan of a zaphrentoid coral as represented by a schematic figure taken from Kunth, 1869–70. In the course of this Gordon corrects a confusion of mine, corrected elsewhere, in which I transpose the terms cardinal and counter septa; apparently, however, he does not realize the difference in the septal plan as established from the external ridges and grooves and that from the disposition of the septa within the calice.

In inverting my figures Gordon is altogether at variance with every recent worker on the Zoantharia. The dorso-ventral disposition of Kunth's schematic figure was given before much was known of the morphology and relationships of the Zoantharia. It would have been much easier and displayed a wider appreciation of recent work on the subject if Gordon had inverted his own figure and allowed the others to retain the orientation originally given them.

The main contention of the paper centers in the number of primary septa (protosepta) in the Rugosa, whether four or six. The great importance for phylogenetic purposes of a correct determination of this demands that Gordon's remarks and evidence should be submitted to thorough analysis. In my paper on *Lophophyllum proliferum* I showed that this species has six primary septa, thereby confirming the account of Pourtalès in 'Deep Sea Corals.' Gordon does not question this hexamerism, but attempts to explain it as a case of acceleration; according to his idea four primary septa were originally present, but the time of appearance of a third pair has been hastened so as to give six primary septa. No facts nor valid arguments are adduced in

[1] *Amer. Jour. Science*, February, 1906.

support of this purely hypothetical acceleration; much is made of a suggestion that acceleration is likely to occur because *Lophophyllum* appears late (Carboniferous) in the geological history of the Rugosa. The author then produces what he considers evidence in favor of a primary tetrameral plan. This rests entirely upon a decalcified silicified specimen of *Streptelasma profundum* (Owen) in which no doubt was left in the author's mind that four of the strongest septa extended farthest down into the base of the calice. No sections are given, and no other suitable material seems to have been at command.

I, likewise, have in my possession numerous decalcified silicified specimens of *S. profundum,* the septal plan of one of which is figured in *Biol. Bull.,* June, 1905, p. 39. Some of these are beautifully perfect, and present all the appearances described by Gordon, but one would scarcely think of using mere surface views for the determination of a question of such fundamental importance, especially when more reliable means are available. Since the publication of my paper in 1902 I have made special efforts, with the assistance of grants from the Carnegie Institution, to secure from all parts typical species of the Rugosa with perfect tips suitable for the investigation of this particular problem. Any one familiar with the subject knows how very rare such specimens are and the difficulties which surround their examination. From my study of these, by the method of grinding, I can now state that *in five different species I have definitely determined the presence of six primary septa,* all equal, and situated at equal distances apart. These species are *Streptelasma rectum* Hall, already figured in *Biol. Bull.,* June, 1905, *Cyathaxonia cynodon* E. & H., *Hadrophyllum glans* (White), *Hadrophyllum pauciradiatum* E. & H., and *Microcyclus discus* Meek & Worthen. Many other species have been investigated, but for one reason or another their tips were unfavorable for showing the primary septa, yet in tracing the development of the later septa this so closely agreed with the species mentioned that there can be no reasonable hesitation in assuming that their primary septa were hexameral. In no instance were there only four protosepta.

Thus, with the addition of *Lophophyllum proliferum,* the hexamerism of which Gordon does not dispute, there are now six known species of Rugosa each having six primary septa, while not a single undoubted instance of only four primary septa has been brought forward. Moreover, the geological distribution of the species mentioned is so wide, from the earliest to the latest appearance of the Rugosa, that Gordon's main argument in favor of acceleration fails in its application. Unless, therefore, fresh and weighty evidence to the contrary should be forthcoming we are reasonably justified in considering the primary hexamerism of the Rugosa as established.

The underlying significance of the primary hexamerism of the Rugosa is that it admits of the relationship of the group with other Anthozoa being established. In the past the assumed tetramerism has led to many fanciful suggestions. In my original paper I showed conclusively that the Rugosa find their nearest modern relatives among the zoanthid actinians, and subsequent work, especially on the fossula, has but served to confirm this. Unless Gordon can produce more acceptable evidence than is contained in his paper under review his contribution must be regarded as a retrograde step in our efforts to determine the phylogenetic relationships of the Rugosa.

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THE SOURCE OF THE ENERGY OF CYCLONES.

TO THE EDITOR OF SCIENCE: In the issue of SCIENCE of May 5 last you were good enough to publish a communication of mine suggesting the source of origin of cyclones, cold waves, and tornadoes. Since the appearance of that article there has occurred to me the suggestion of the derivation of the energy involved in the movement of these bodies, or I might better say, a mechanism of the action of the prevailing westerly winds in accomplishing their movement, that has not hitherto been suggested by any one, as far as I know.